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PREPARATION OF GLUTTEN-BASED CHEWING GUM

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Project Update

February 10, 1998

Preparation of Gluten-based Chewing Gum

Objective

The purpose of this project is to modify McGrath Farm's existing gluten gum base so that a more elastic gum with stronger chewing properties is produced.

Work Performed to Date

Various chemical treatments have been applied to the gluten gum base to increase the chewing strength of the gum. The addition of oat bran had a synergistic effect to impart greater elasticity to the product. The gum base formulation has been modified and the optimum level of oat bran to include in the gum has been determined.

New, desirable flavours have been incorporated into the gum formulation in order to meet demands of chewing gum flavours in the US. In the US market cinnamon flavoured chewing gum is reported to be the most popular whereas Canadians prefer spearmint. Thus, in addition to the existing spearmint flavour, a desirable cinnamon flavour has been incorporated into the gluten based chewing gum. Appropriate red colouring has also been included in the cinnamon flavoured product.

Advantages of the Gluten Chewing Gum

The gluten gum base has the advantages of being non-stick, biodegradable, digestible/edible and all natural in comparison to conventional plastic gum resins. The all natural and digestible attributes of the gluten gum might also be beneficial in a product which would carry a nutraceutical or pharmaceutical and release it when chewed. The industry names for utilizing gums as a drug and nutraceutical delivery system includes "supplemental gum" or "nutraceutical gum".

Formulation of nutraceutical and supplemental gums can be difficult since the active components may bind to the plastic gum resin. The advantage of a gluten gum base is that such active components will not bind to gluten and will be released more readily.

The gluten gum would have a competitive advantage for nutraceuticals and pharmaceuticals which cannot be delivered by conventional plastic gum bases. Thus, in addition to entering the conventional chewing gum industry, the gluten gum base will also be introduced to manufacturers of nutraceutical and supplemental gums.

Work to be Done

Before approaching the gum industry, the gluten gum base needs to be prepared in a presentable form such as a coated gumball. There is approximately $10,000 remaining in the current project and we will direct the remaining resources into developing a coating for the product and presenting the product to at least one manufacturer of specialty gums.

The gluten based gum will require a moisture barrier to prevent moisture transfer into the coating. The approach to coating the gum will be to first cover it with a moisture barrier layer which may include ingredients such as beeswax or carnauba wax. A standard candy coating formulation would then be applied to form the outer shell of the gumball.

After the gluten gum is prepared into a presentable form, prototype samples will be prepared and presented to Gum Tech International, Incorporated, Phoenix, Arizona. Gum Tech is a medium sized manufacturer of specialty chewing gums, including nutraceutical and supplemental gums. This company is a good candidate for establishing a joint venture on the gluten based chewing gum. They are a relatively new manufacturer with innovative marketing concepts and have sufficient space and interest in expanding their processing line to produce new products (see attachment).

Representatives from McGrath Farms and POS will travel to Gum Tech to present the gluten gum product and discuss a potential joint venture relationship between them and McGrath Farms. Mr. John Cassens of Cassens Consulting, Norwood, New Jersey will also attend the presentation at Gum Tech. Mr. Cassens is a food industry consultant specializing in introducing new products to the nutraceutical, confectionery and flavour industries. His knowledge of marketing and emerging trends in these industries will be valuable in planning a market entry strategy for the gluten gum. Mr. Cassens is familiar with the gluten gum product patented by McGrath Farms and realizes the potential applications of the product in conventional chewing gums as well as nutraceutical and supplemental gums.

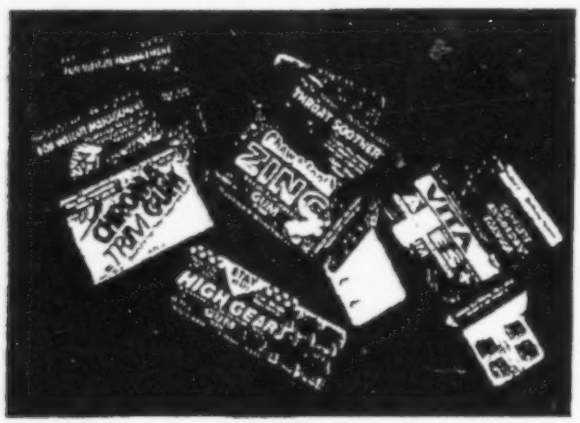
notebook

NUTRACEUTICALS

Ginseng, guarana, green tea, ginkgo, garlic—this is the nutraceutical mantra. Whether you call them functional foods or nutraceuticals, they are coming to a candy counter near you.

Nutraceutical ingredients that were previously only offered via capsules or in teas now are appearing in candy products. Although foreign countries such as Germany and Japan have had nutraceutical confections for a number of years, the United States lags behind, as in other food categories. "In the United States, I think we'll start seeing more herbs added to confections, especially echinacea and ginseng, which are growing in popularity," says Silverwater.

Lussenden Candy Co., Stanley, WI, makes a line of ginseng jellies from world-renowned Wisconsin ginseng. Besides the U.S. market, the company has started expanding into Asian markets, says Del Lussenden, company owner. Eating eight pieces of the candy is equivalent to one ginseng capsule.



Formulation of nutraceutical gums is tricky. You have to make sure the ingredients do not get bound into the gum matrix. Coatings can serve as carriers of some active ingredients.

Tropical Source Green Tea Crisp chocolate bar from Cloud Nine, Inc., Hoboken, NJ, is an organic, nondairy product that contains green tea, puffed basmati rice and tofu. The cocoa beans are certified organic, as well as the other ingredients.

Texas-based Mannatech introduced Phyto-bears in 1994. These gummy bears are aimed at children that won't eat their vegetables. According to company literature, Phyto-Bears are filled with the equivalent of four ounces of fresh plant juice in each gummy. They contain "a proprietary blend of flash-dried, vine-ripened broccoli, Brussels sprouts, cabbage, carrots, cauliflower, garlic, kale, onions, papaya, pineapple, tomato and turnip."

"The key to Phyto-Bears' effectiveness lies in the proprietary flash freeze-drying process, and that the vegetables are vine-ripened," says a company spokesperson. Phyto-Bears are available only through indepen-

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cent distributors.

Until recently, chewing gum has been largely overlooked as a vehicle for vitamin and nutraceutical fortification. "People are looking for good flavor and good chew in a chewing gum," says Gary Kehoe of Gum Tech International, Inc., Phoenix, AZ. "We've taken this a step further and tried to give consumers a functional product. Chewing gum is a good vehicle because some don't like to swallow pills, and unlike pills, you don't need water–you can chew these anytime, anywhere."

Gum Tech's original product in its line of functional chewing gums was Buzz Gum with guarana. Today, the company has chewing gums with appetite suppressants, antioxidants, calcium and ginseng. Another gum is specifically designed as a dental chewing gum for clean teeth. CigArrest anti-smoking gum was launched last month. All the gums are sugar-free.

Gum Tech recently added Chew and Sooth to its line. It contains ingredients to help fight colds–echinacea, vitamin C and zinc–as well as anise, clove oil, honey and slippery elm.

High Gear, another recent addition, has the tag line "Stay awake, stay alive." It is an energy gum for commuters or for those who need quick energy. It contains natural-sources stimulants including tea extract, guarana, kola nut and Siberian ginseng. "You can use this in place of coffee to avoid falling asleep at the wheel," says Kehoe. "Statistics show that around 65 percent of highway fatalities are due to falling asleep at the wheel."

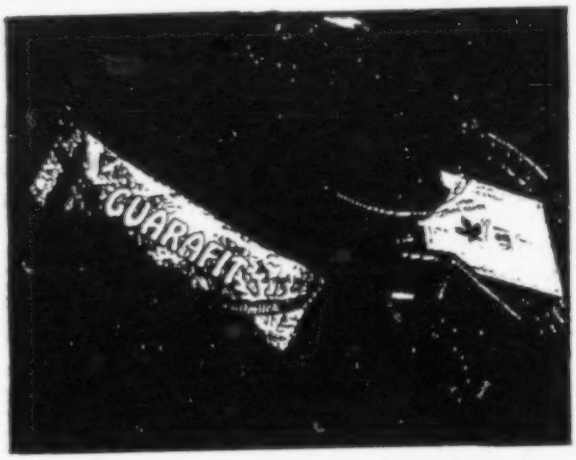
Gum Tech's nutrient chewing gums are either classified as over-the-counter products or labeled as dietary supplements under the Dietary Supplement Health and Education Act of 1994.

Getting a good flavor is one of the primary formulation challenges, notes Kehoe. Herbal ingredients are notorious for having musty, earthy notes that can be difficult to mask. "We have to determine what flavors complement and mask the ingredients. The flavors are tailor-made according to the individual blend of ingredients."

Gum Tech's products are carefully formulated for the most efficient nutrient delivery, says Kehoe. "Some materials are absorbed very well in the mouth and some aren't," he says. "For example, you need to keep vitamins B-12 and C in the oral cavity for as long as possible to maximize absorption." The chewing gum is formulated around the combination of ingredients according to how well they are absorbed in the oral cavity, says Kehoe.

The gums are in a coated tablet form. Depending on the ingredient's absorption rate, the gum is engineered accordingly, says Kehoe.

"Most gum chewers chew gum for about 20 to 30 minutes at a time," says Kehoe. "But we've seen people chew gum anywhere from five minutes to four hours."



Ginseng is one of the most popular herbal ingredients for providing energy. Besides teas, it is now in snack bars, beverages, candies and chewing gum.

There are other challenges of taking a product like gum–which people chew for pleasure, dental health or fresher breath–and making it a functional food. "Our hardest chore has been educating the public," says Kehoe. "We are trying to make them aware that our chewing gums are a new nutrient-delivery system. It gives people another option of getting nutrients into their bodies."

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COMPANY PROFILE

Cassens Consulting, founded by John F. Cassens, is a strategic business development firm which provides a variety of services to the Nutraceutical, Pharmaceutical, Health & Nutrition and the Food & Beverage Industries. The services provided are to both start up and Fortune 500 Companies. All activities are in-house or through experienced consultants available to Cassens Consulting.

Areas of expertise include:

Identification of new technologies/new products for the above industries
Intermediary between inventor and Fortune 500 Companies
Technical management for new product development-formulation packaging, initial test market
Marketing Management-sales,organization, distribution channels, market research
Venture Capital Identification-start up or existing businesses
Nutraceutical consulting to vendors-ingredients/equipment
High level contacts at Health/Nutrition, Pharmaceutical and Food companies

Available for presentations on "Nutraceuticals" (technical, marketing, legal aspects).

Other services as per discussion. Gratis initial consultation.

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